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### Algebraic Expressions

Simplify the following expressions.

- 1.)  $5a + 6a =$       2.)  $3a + a =$       3.)  $8a - 3a =$   
 4.)  $10a - 2a =$       5.)  $9a + 4a =$       6.)  $11a - 7a =$   
 7.)  $4b + 3b =$       8.)  $12b - 6b =$       9.)  $5b + 9b =$

Complete the following expressions.

- 1.)  $12 \times 3 - 5 + 4 =$       2.)  $4 + 7 \times 2 - 8 =$       3.)  $5 - 7 + 2 \times 10 =$   
 4.)  $15 \div 3 + 8 \times 5 =$       5.)  $11 \times 3 - 12 \div 4 =$       6.)  $5 + 9 - 16 \div 2 =$

Combine like terms to simplify the following expressions.

- 1.)  $3a(a + 4) - 2a + 7 =$       2.)  $5a + 3a - 15 + 3 =$   
 3.)  $4(3 + 9) + 10a - 4a =$       4.)  $(21 - 7)(4a + a) - 12 =$   
 5.)  $17 + 4(3 + a) - a =$       6.)  $10a - 4a + 27 + 3 =$

**KEY**

**Algebraic Expressions Unit Test (Continued)**

**A. Simplify:** Show the property associated to the answer key.

1.  $4 + 4 = 8$       Commutative Property  
 $4 + 4 = 4 + 4 = 8$       Associative Property  
 $4 + 4 = 8$       Identity Property  
 $4a + 4a = 8a$       Distributive Property

**B. Evaluate:** Simplify each expression.

1.  $4a + 3a = 7a$        $3 + 7a = 10$        $8a - 3 = 5a$   
 $4 + 3 = 7$        $3 + 7 = 10$        $8 - 3 = 5$

2.  $4(3 + 9) = 48$        $4(12) = 48$        $4(12) = 48$   
 $4 \times 12 = 48$        $4 \times 12 = 48$        $4 \times 12 = 48$

3.  $17 + 4(3 + a) - a = 25 + 3a$        $17 + 12 + 4a - a = 29 + 3a$   
 $17 + 12 = 29$        $4 \times 3 = 12$        $4a - a = 3a$

**C. Equivalent Expressions:**

1. Write two expressions that are equivalent to  $7x + 8y$ .  
 Answers will vary. E.g.,  $7x + 8y + 0$  or  $7x + 8y + x - x$

2. Is  $x^2$  equivalent to  $2x$ ? Why or why not? (Show your work.)  
 No. They are not equivalent.  $x^2$  is  $x$  times  $x$ .  $2x$  is  $x$  times 2. They are not the same.

3. Simplify each expression. Then write the expression that is equivalent to  $4x + 12y$ .  
 $4x + 12y = 4(x + 3y)$        $4x + 12y = 4x + 12y$        $4x + 12y = 4x + 12y$   
 $4x + 12y = 4x + 12y$        $4x + 12y = 4x + 12y$        $4x + 12y = 4x + 12y$

37. Each  consists of 4 line segments. Find the total number of line-segments in the following figure :
38. What is the number of diagonals that can be drawn from one vertex in an octagon?
39. What is the number of diagonals that can be drawn from one vertex in a heptagon?
40. Subtract  $x^2 - 3xy + 7y^2 - 5$  from  $6xy - 4x^2 - y^2 + 5$
41. By how much is  $2x^3 + 7x^2 - 5x + 6$  greater than  $x^3 - 2x^2 + x + 5$ ?
42. By how much is  $a^2 - 7a + 5$  less than  $3a^2 + 2a + 5$ ?
43. Subtract  $1 - 5y^2$  from  $y^3 + 7y^2 + y + 1$ .
44. Simplify :  $2x - \{5y - (x - 2y)\}$
45. Simplify :  $5a - \{3a - (2 - a) + 4\}$ .
46. What is the coefficient of  $y$  in the term  $\frac{4}{3}x^2y^2z^2$ ?
47. Add the algebraic expression :
- (i)  $7x - 4$  and  $3x + 1$   
 (ii) Find the coefficient of  $x$ .
48. Add  $a^2 + b^2 + c^2 - 3abc$  and  $a^2 - b^2 + c^2 + abc$ .
49. Add the expressions  $7a - 5ab + 4b^2 - 6a - ab - 8b$  and  $-4a + 2ab + 3b$ .
50. Add  $2x^2 - 3x + 1$  to the sum of  $3x^2 - 2x$  and  $3x + 7$ .
51. Simplify :
- (i)  $12a^2b + 3ba^2$   
 (ii) Also find the coefficient of the result.

### ANSWERS

1.  $\frac{5}{21}x^2y$       2.  $\left(\frac{2}{3}y + 3p\right)$   
 3.  $(2y + 3z)$       4.  $x^2 - 3y^2$   
 5.  $-1$       6.  $-12x - 12y - 12$   
 7.  $(-15x, 7)$       8.  $(x + y + 11)$   
 9.  $\left(\frac{x}{2} - \frac{7}{2}y\right)$       10.  $10$

# Rational Expressions: Addition and Subtraction with Like Denominators

Simplify the expression.

1)  $\frac{2}{y^2-16} + \frac{4}{y^2-16}$

6)  $\frac{5x}{2x+1} - \frac{3x-1}{2x+1}$

2)  $\frac{9x}{3x-2} - \frac{6}{3x-2}$

7)  $\frac{4x}{16x^2-4} + \frac{2}{16x^2-4}$

3)  $\frac{y}{y^2-16} + \frac{4}{y^2-16}$

8)  $\frac{x}{x^2-2x+1} - \frac{1}{x^2-2x+1}$

4)  $\frac{9x}{3x-2} - \frac{8x+5}{3x-2}$

9)  $\frac{2x}{16x^2-4} + \frac{1}{16x^2-4}$

5)  $\frac{7x}{2x+1} - \frac{6x-6}{2x+1}$

10)  $\frac{4x+9}{x^2-2x-3} - \frac{x+15}{x^2-2x-3}$



Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

## Pre-Test - Study Guide

Consider the lines, triangles, rectangles, squares, and other polygons. Using the variables, write the area formulas, label and explain equations.

1. John has 3 more than twice the amount of marbles that Mike has. What of the following expressions represents the amount of marbles that John has? (Let  $n$  represent the number of marbles Mike has.)

$3n$       $2n+3$   
  $n+3$       $3n+2$

2. Which of the following verbal expressions represents the following algebraic expression?  $2(n+8)$

2 times a number plus 8  
 twice the difference between 8 and a number  
 8 less than twice a number  
 twice the difference between a number and 8

3. Which of the following means "divisible by 2"?

$4y$       $y+4$   
  $2+y$       $y+2$

4. Select the algebraic expression that means a more than the product of 8 and a number.

$8n+3$       $8n+10$   
  $18n$       $3n+8$

5. Select the expression that is equivalent to the following:  $3(3x+6y)$

$9xy$       $9x+36y$   
  $9x+18y$       $9x+6y$

6. Simplify the following expression:  $3x+5x+y+y+y$

$11y$       $8x+3y$   
  $8x+y$       $9x+3y$

7. What expression is equivalent to the following expression?  $12x+y$

$12x+2x-2y$       $8x+7y+7x$   
  $8x+y+4x-y$       $12x+8y-3x-2y$

8. What part of the expression does the number 8 represent in the following:  $8x+4$

exponent     variable  
 coefficient     constant

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Click Share to make it public. Sometimes, any factor in a term is called the coefficient of the remaining part of the term. Tom has Rs.  $3x2y$  and he was given another Rs.  $9x2y$  by his mother. 2 D. 0 D. Factors may be numerical as well as algebraic (literal). The coefficient of  $xy$  in  $3x2z + 7xyz - 2z2x$  is A.  $5x2y$  B.  $5xy2$  C.  $25x2y$  D. None of these Correct Option: A Explanation: Here, Tom's money = Rs.  $3x2y$  Amount given by his mother = Rs.  $9x2y$  Total amount of money = Rs.  $12x2y$  So, amount of money left with him = Total money - Price of toy = Rs.  $12x2y - Rs. 7x2y$  Therefore, option (1) is correct. Algebraic Expressions Real-World Link Cell Phone Charges For a cell phone plan that charges a monthly fee of \$10 plus \$0.10 for each minute used, you can use the equation  $C = 10 + 0.10m$  to calculate the monthly charges for using  $m$  minutes. a)  $7a2b+7b$  b)  $7a2b+2b+5$  c)  $10a2b+10b$  d)  $(10a2+10)b$  10) What is the value of the expression when  $t=2$ ?  $(7+t)-(t+4)$  a) 2 b) 3 c) 10 d) 15 11) Expand the expression:  $-4(5x-8)$  a)  $52x$  b)  $12x$  c)  $-20x + 32$  d)  $-20x - 32$  12) Write an algebraic expression for the following verbal expression. -  $10xyz2$ ,  $3xyz2$  C. a)  $9x2+6xy+y2$  b)  $9x2+3xy+y2$  c)  $9x2+y2$  d)  $9x2-y2$  14) What is the simplest form of  $(3c2-8c+5)+(c2-8c-6)$ ? The factors of the term  $-xy2$  are A.  $x \times y \times y$  B.  $n - 3$  E.  $-7xy2z - 7x2yz$  B. A. Bowling has, which of the following expressions represents the number of quarters Mrs.  $7x^3-2x^2y+xy^2-y^3$  4. This leaderboard is disabled as your options are different to the resource owner. -1 B. Which expression represents the perimeter of the rectangle? Simplify the expression:  $7x3 - 3x2y + xy2 + x2y - y3$  A.  $7x3 - 2x2y + xy2 - y3$  B.  $2x+2$  Algebraic Expressions Practice Test Question Answers Document Type Download Link Free Editable Doc File Free Printable PDF File -5 E. To find the value of an expression, we substitute the values of the variables in the expression and then simplify. a) 3 b) 6 c) 12 d) 18 e) 36 17) Simplify the expression.  $3(2x+y) + 5(4x-7y)$  a)  $26x - 32y$  b)  $26x + 38y$  c)  $26x - 6y$  d)  $10x - 10y$  18)  $5x-5y+x+y+6x-6y$  is equivalent to  $12x+36y$ . 38.5 cm B. 65.5 C. Which expression tells how many stamps John has now? The side length of the top of square table is  $x$ . Bowling.  $-1 \times x \times y \times y$  E. This leaderboard has been disabled by the resource owner. 3.5z C.  $-2xyz2$ ,  $2x2yz$  8. A term is the product of factors.  $5n + 2$  D.  $6m2+2mn-n2-3mn$  a)  $(3m-n)(n+2m)$  b)  $(3n+m)(2m-n)$  c)  $(3n+m)(2m-n)$  d)  $(3m+n)(2m-n)$  20) The length of a rectangle is  $(y + 5)$ . The sum of 150 and three times a number a)  $3n + 150$  b)  $150n + 3$  c)  $3n - 150$  d)  $150n - 3$  13) Which of the expressions below is equivalent to  $(3x+y)2 ? -1$  C.  $2n + 1$  B.  $-2$  D.  $-5 = (1)3 + (1)2(-2)+(1) (-2)2 + (-2)3 = 1 - 2 + 4 - 8 = 5 - 10 = - 5$  5. a) True b) False 19) Factor the following completely.  $-2.7.4 + x$  B. Bowling have altogether? 11 E. The width of the rectangle is  $(y)$ . The expression for the number of diagonals that we can make from one vertex of a  $n$  sided polygon is: A. He gave 12 stamps to his sister.  $-1 \times y \times y$  C. The expression for perimeter is: A. Expressions are made up of terms.  $-1 \times x \times y$  D.  $3xyz$ ,  $3x2y2z2$  D. Then out of the total amount of money that he had, he used some to buy a toy car of Rs.  $7x2y$ . 1 B. -1 Answer: D. 4 E. The value of  $3x2 - 5x + 3$  when  $x = 1$  is A. The coefficient is the numerical factor in a term.  $4x$  D. In general, an expression with one or more than one term (with nonnegative integral exponents of the variables) is called a 'Polynomial'. NOTA Answer: D  $-1 \times x \times y \times y \times 3$ . -1.5 10. Find each side of an equilateral triangle given below, if it's perimeter is 240 cm. a) N + 12 b) N - 12 c)  $12 - N$  d)  $12 \times N$  9) Which of the expressions below is equivalent to  $b(5a2+2)+b(2a2+3)$ ? a)  $4y + 10$  b)  $y(y+5)$  c)  $2y + 5$  d)  $4y + 5$  e)  $2y + 10$  Log in required Fonts Default Primary Handwriting Modern Geometric Traditional Log in required This leaderboard is currently private. Gladstone has 4 times as many quarters as Mrs. 17xy Answer: A.  $5yz$  2.  $7x3 - 2xy3$  E. 1) Simplify the expression:  $6m+10-10m$  a)  $4m+10$  b)  $-4m+10$  c)  $16m+10$  d)  $6m$  2) Simplify the following:  $2y + 9 + 8y + 7$  a) 26 b) 10y + 16 c) 26y d)  $10y + 9 + 7$  3)  $-2(n - 6)$  a)  $-2n + 12$  b)  $2n - 6$  c)  $-2n - 12$  d)  $n - 12$  4) Combine like terms:  $3x-2y+4z-x+5y+z$  a) Cannot be simplified b)  $2x + 3y + 5z$  c)  $12x + 7y + 4z$  d)  $2x - 3y + 5z$  5) Evaluate the expression  $4(X + 9)$  when  $X = 2$ . n - 2 C.  $4xyz2$ ,  $4x2yz$  E. Gladstone and Mrs. Which of the following is a pair of like terms? 77 cm D. If  $q$  represents the number of quarters that Mrs. Algebraic Expressions Practice Test Questions Answers: An algebraic expression is formed from variables and constants using different operations. Algebraic Expressions Practice Test Name Algebraic Expressions Test Prep Type of Question Multiple Choice Question Answers Subject Math Total Question 10 Test Type Sample / Mock Test Editable & Printable PDF / Doc YES (Download link is given below) Available of Answers YES Difficulty Level Elementary Algebra Algebraic Expressions Practice Test Question Answers SET 1 1.  $2x$  C. a) 23 b) 45 c) 24 d) 44 e) 21 f) 43 6) Simplify:  $2x+3x2-5x+4-7x2$  a)  $7x2+4$  b)  $7x+10x2+4$  c)  $-4x2-3x+4$  d)  $-3x6$  7) Distribute and simplify the following:  $3(x + 4) + 2(5 - x)$  a)  $27x$  b)  $5x + 12 + 15$  c)  $0$  d)  $x + 22$  8) N stands for the number of stamps John had.  $7x3-2x3y$  D. 16x 9. 7z E. a)  $(4 \times q) + q$  b)  $(4 + q) \times q$  c)  $(4 + q) + q$  d)  $(4 \times q) \times q$  16) if  $x = 2$ ,  $y = 3$ , and  $z = 4$ , then what is  $(4y/2x)(9z/3x)$ ?  $7x3 - 2x2y + xy2$  C. 80 cm E. a)  $3c2-1$  b)  $4c2+11$  c)  $4c2-16c-1$  d)  $2c2-16c-1$  15) Mrs. 10 D. 90.5 cm 6. Number of terms in the expression  $3x2y - 2y2z - z2x + 5$  is A. 8x E. -5z B. How much money is left with him? 0 C. Find the value of the following expressions at  $a = 1$  and  $b = -2$ :  $a3 + a2b + ab2 + b3$  A.

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